

**IN THE UNITED STATES DISTRICT COURT  
FOR THE SOUTHERN DISTRICT OF TEXAS  
HOUSTON DIVISION**

US SYNTHETIC CORPORATION,

Plaintiff,

v.

SHENZHEN HAIMINGRUN SUPERHARD  
MATERIALS CO., LTD.,

Defendant.

CIVIL ACTION NO.

COMPLAINT FOR PATENT  
INFRINGEMENT

**DEMAND FOR JURY TRIAL**

**COMPLAINT AND JURY DEMAND**

Plaintiff US Synthetic Corporation (“US Synthetic” or “Plaintiff”), by its undersigned counsel, for its Complaint against Shenzhen Haimingrun Superhard Materials Co., Ltd. (“Haimingrun” or “Defendant”), states and alleges upon information and belief as follows:

**NATURE OF THE ACTION**

1. This is a civil action for patent infringement of U.S. Patent Nos. 10,508,502 (“the ’502 Patent”), 10,507,565 (“the ’565 Patent”) and 8,616,306 (“the ’306 Patent”) (collectively, “patents-in-suit”) arising under the United States Patent Laws, Title 35, United States Code, § 1, *et. seq.*, and in particular under 35 U.S.C. § 271.

2. The patents-in-suit are related to polycrystalline diamond (“PCD”) and polycrystalline diamond compacts (“PDC” or “PDCs”). A true and accurate copy of the ’502 Patent is attached hereto as Exhibit A. A true and accurate copy of the ’565 Patent is attached hereto as Exhibit B. A true and accurate copy of the ’306 Patent is attached hereto as Exhibit C.

### **THE PARTIES**

3. US Synthetic is a corporation organized and existing under the laws of the State of Delaware and maintains a place of business at 1260 South 1600 West, Orem, Utah 84058.

4. US Synthetic is a subsidiary of ChampionX Corporation, which is headquartered at 2445 Technology Forest Blvd., Building 4, Suite 1200, The Woodlands, Texas 77381.

5. Haimingrun is a corporation existing and organized under the laws of China, having a principal place of business at 102, Building A7, Zhihui Innovation Park, Meiying (Phoenix), No. 3, Fengxing Xingye Third Road, Fuyong, Shenzhen City, Guangdong, China.

6. Haimingrun is in the business of, *inter alia*, manufacturing, marketing, and selling PDC products throughout the United States, including in Texas.

### **JURISDICTION AND VENUE**

7. Plaintiff incorporates by reference the prior paragraphs of this Complaint as if fully set forth herein.

8. This Court has subject matter jurisdiction under 28 U.S.C. §§ 1331 and 1338(a).

9. This Court has personal jurisdiction over Defendant by virtue of, *inter alia*, its systematic and continuous contacts with Texas and because Defendant infringes the '502, '565 and '306 Patents in Texas and in this judicial district. Among other things Defendant has offered for sale and sold, and continues to offer for sale and sells its infringing 1613S18 products for importation, promotion, sales and distribution to resellers and end users throughout the United States, including in Texas and in this judicial district.

10. Defendant participates in or imports into the United States, sells for importation into the United States, and/or sell after importation into the United States, one or more infringing products. Haimingrun's website notes that, "[w]hile exported to such countries and regions as the

U.S., Canada, Russia, and Europe, Haimingrun’s PDC products have also long been applied in various Chinese major oil fields and drill bit manufacturers . . . .” *See* Exhibit D.

11. Defendant has thus infringed and continues to infringe the patents-in-suit directly, contributorily, and by inducement in the United States, in Texas and in this district. Defendant derives substantial revenue from its sales of infringing products to oil and gas customers in Texas and in this judicial district, and Defendant purposefully avails itself of the privilege of conducting activities in Texas, thus invoking the benefits and protections of the laws of Texas.

12. Venue is proper in this judicial district under 28 U.S.C. §§ 1391(b) and (c) against Defendant because it is incorporated in China and may be sued in any judicial district in the United States in which it is subject to the court’s personal jurisdiction.

### **FACTS**

13. US Synthetic is headquartered in Orem, Utah, and is a leading designer and supplier of polycrystalline diamond<sup>1</sup> products for use in drill bits, bearings, and other industrial applications. The polycrystalline diamond may be used to make polycrystalline diamond compacts or “PDCs.” PDCs can be shaped as cylindrical parts, as shown in the picture below. Drill bit manufacturers purchase and use PDCs as cutters for rotary drill bits, also shown below.



PDC cutters



Drill bit with PDC cutters

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<sup>1</sup> **P**olycrystalline **d**iamond is often referenced in the industry as “PCD.”

14. The PDCs provide a hard, durable cutting surface for earth-boring applications, including drilling for oil and gas resources. PDCs can also be used in other harsh, high-wear, or high-temperature applications, such as thrust-bearing assemblies, radial-bearing assemblies, wire-drawing dies, artificial joints, machining elements, and heat sinks.

15. US Synthetic has invested millions of dollars in the United States in plant/equipment and labor to research, develop, and manufacture polycrystalline diamond and PDC products. US Synthetic is well known as a market leader in PDC technologies.

16. US Synthetic has protected innovative PDC technologies with the patents at issue in this case. US Synthetic's patent rights include the '502, '565 and '306 Patents. US Synthetic is the assignee and owner of each of the patents-in-suit.

17. The '502 Patent is entitled "Polycrystalline Diamond Compact." The '502 Patent issued on December 17, 2019, based on an application (Application No. 16/358,281) filed on March 19, 2019, which is a continuation of Application No. 13/789,099, filed March 7, 2013, now U.S. Patent No. 10,287,822, which is a continuation of 13/623,764, filed on September 20, 2012, now U.S. Patent No. 8,616,306, which is a continuation of Application No. 12/690,998, filed January 21, 2010, now U.S. Patent No. 8,297,382, which is a continuation-in-part of Application No. 12/244,960, filed on October 3, 2008, now U.S. Patent No. 7,866,418. The '502 Patent will expire no sooner than October 3, 2028.

18. The '565 Patent is entitled "Polycrystalline Diamond, Polycrystalline Diamond Compacts, Methods of Making Same, and Applications." The '565 Patent issued on December 17, 2019, based on an application (Application No. 15/080,379) filed on March 24, 2016, which is a continuation of Application No. 13/486,578, filed on June 1, 2012, now U.S. Patent No.

9,315,881, which is a continuation-in-part of Application No. 12/858,906, filed on August 18, 2010, now U.S. Patent No. 9,459,236, which is a division of Application No. 12/244,960, filed on October 3, 2008, now U.S. Patent No. 7,866,418. The '565 Patent will expire no sooner than October 3, 2028.

19. The '306 Patent is entitled "Polycrystalline Diamond, Polycrystalline Diamond Compacts, Methods of Fabricating Same, and Various Applications." The '306 Patent issued on December 31, 2013, based on an application (Application No. 13/623,764) filed on September 20, 2012, which is a continuation of Application No. 12/690,998, filed on January 21, 2010, now U.S. Patent No. 8,297,382, which is a continuation-in-part of Application No. 12/244,960, filed on October 3, 2008, now U.S. Patent No. 7,866,418. The '306 Patent will expire no sooner than October 3, 2028.

### **THE ACCUSED PRODUCTS**

20. The Accused Products include PDC products designed for use in the oil and gas industry.

21. The 1613S18 PDC product sold by Defendant is an exemplary Accused Product, and by itself infringes at least the following Asserted Claims of the '502 and '565 Patents:

	'502 Patent	'565 Patent	'306 Patent
Infringed Claims	1, 2, 4, 8-11	1-4, 6, 8, 10, 14	15, 20, 21

**Table 1.** List of Claims Infringed by the Exemplary 1613S18 PDC Product

22. According to an analysis of sample products and Defendant's own product descriptions, Defendant has infringed and continues to infringe at least the Asserted Claims of each of the Asserted Patents, as set forth in the chart above. Defendant infringes the Asserted Claims of the Asserted Patents literally and/or under the doctrine of equivalents by making and

selling products that infringe, by importing those products into the United States to offer them for sale, and/or by selling those products within the United States after importation.


### **FIRST CLAIM FOR RELIEF**

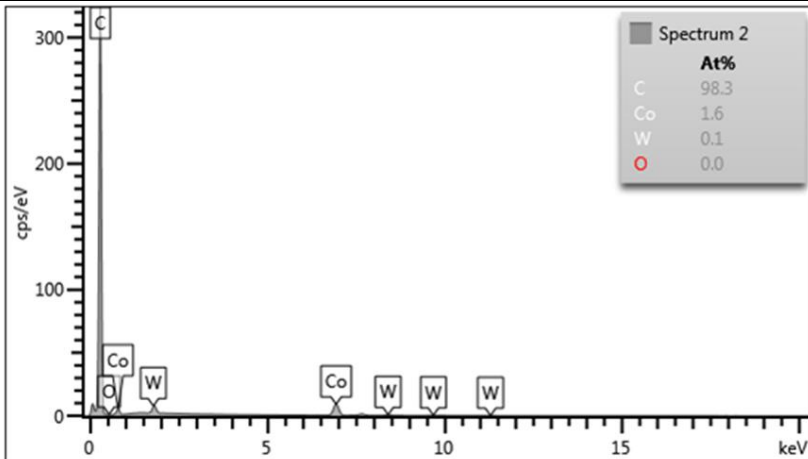
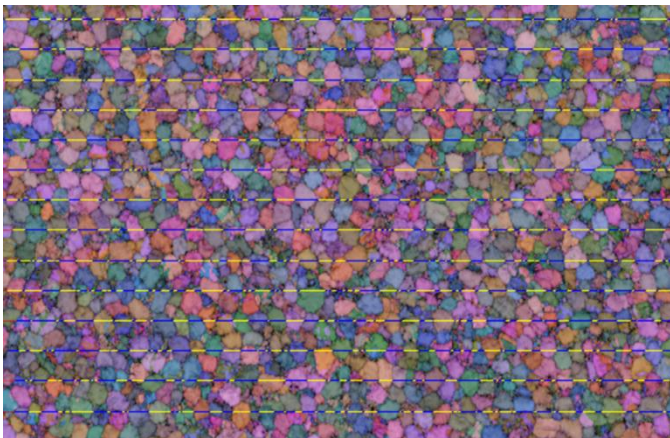
#### **Patent Infringement of the '502 Patent Under 35 U.S.C. § 271**

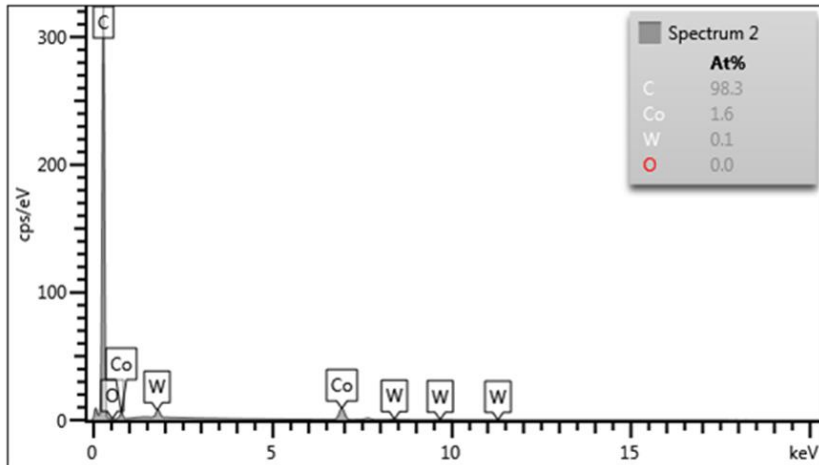
23. US Synthetic incorporates by reference every allegation set forth in the foregoing paragraphs of this Complaint as if fully set forth and restated herein.

24. Haimingrun, without the authority or consent of US Synthetic, has been importing, offering to sell and selling, and continuing to offer and sell in the United States Accused Haimingrun Products that infringe at least claims 1, 2, 4, and 8-11 of the '502 Patent.

25. The chart below sets forth exemplary infringement contentions for claim 1 of the '502 Patent based at least in part upon testing performed by US Synthetic:

<b>'502 Patent</b>	
<b>Claim 1</b>	<b>Accused Products</b>
[1] A polycrystalline diamond compact, comprising:	 <p>Pictured above is an example of Haimingrun's 1613S18 cutter. The cutter is a polycrystalline diamond compact.</p>
[2] a polycrystalline diamond table, at least an unleached portion of the polycrystalline diamond table including:	An exemplary 1613S18 cutter includes a polycrystalline diamond table. The polycrystalline diamond table contains at least an unleached region as evidenced by the chart below:

'502 Patent	
Claim 1	Accused Products
	 <p>The image above shows the presence of at least one metal solvent catalyst, cobalt, in at least an unleached portion of the polycrystalline diamond table of an exemplary 1613S18 cutter.</p>
<p>[3] a plurality of diamond grains bonded together via diamond-to-diamond bonding to define interstitial regions, the plurality of diamond grains exhibiting an average grain size of about 50 <math>\mu\text{m}</math> or less; and</p>	 <p>The image above shows a plurality of diamond grains of an exemplary 1613S18 cutter. The EBSD average grain size of the imaged region is 4.02 <math>\mu\text{m}</math>.</p>

'502 Patent	
Claim 1	Accused Products
[4] a catalyst occupying at least a portion of the interstitial regions;	 <p>A catalyst occupies at least a portion of the interstitial regions of an exemplary 1613S18 cutter as evidenced by the chart above.</p>
[5] wherein the unleached portion of the polycrystalline diamond table exhibits a coercivity of about 115 Oe to about 250 Oe;	The unleached portion of the polycrystalline diamond table of an exemplary 1613S18 cutter exhibits a coercivity of 161.6 Oe.
[6] wherein the unleached portion of the polycrystalline diamond table exhibits a specific permeability less than about 0.10 G·cm <sup>3</sup> /g·Oe; and	The unleached portion of the polycrystalline diamond table of an exemplary 1613S18 cutter exhibits a specific permeability of 0.089 G·cm <sup>3</sup> /(g·Oe).
[7] a substrate bonded to the polycrystalline diamond table along an interfacial surface, the interfacial surface exhibiting a substantially planar topography;	A substrate bonded to the polycrystalline diamond table along an interfacial surface is present in an exemplary cutter, the interfacial surface exhibiting a substantially planar topography. The ratio of a surface area of an exemplary cutter's planar interfacial surface to a surface area of an exemplary cutter's substantially planar interfacial surface is 0.9841.
[8] wherein a lateral dimension of the	An exemplary cutter exhibits a lateral dimension of 1.59 cm.



'502 Patent	
Claim 1	Accused Products
polycrystalline diamond table is about 0.8 cm to about 1.9 cm.	

**Table 2.** Exemplary Claim Infringement Chart for Claim 1 of the '502 Patent

26. Defendant infringes the Asserted Claims of the '502 Patent directly and indirectly by causing direct infringement in the United States. Defendant will have had knowledge of the '502 Patent and the infringing nature of its Accused Products at least as of the date of service of this Complaint. Defendant infringes through contributory infringement by selling or offering for sale to third parties, such as its customers, products that are material parts of the inventions claimed in the '502 Patent, knowing that they were especially made or especially adapted to practice one or more of the claims of the '502 Patent, and that have no substantial noninfringing uses, and knowing they are in fact used to directly infringe one or more of those claims, at least through the allegations in this Complaint. Defendant also infringes the at least one claim of the '502 Patent indirectly through inducement by, inter alia, importing, offering to sell and/or selling the Accused Products to third parties, including its customers, with the specific intent that those third parties directly infringe one or more of the claims of the '502 Patent. Defendant actively encourages or aids such infringement through various activities, including descriptions on its website and related materials, and knows—at least through the allegations in this Complaint—that the third parties' acts it has induced, and continues to induce, constitute infringement.

27. Haimingrun's infringement of the Asserted Claims of the '502 Patent has caused and continues to cause damages and irreparable harm to US Synthetic.


## SECOND CLAIM FOR RELIEF

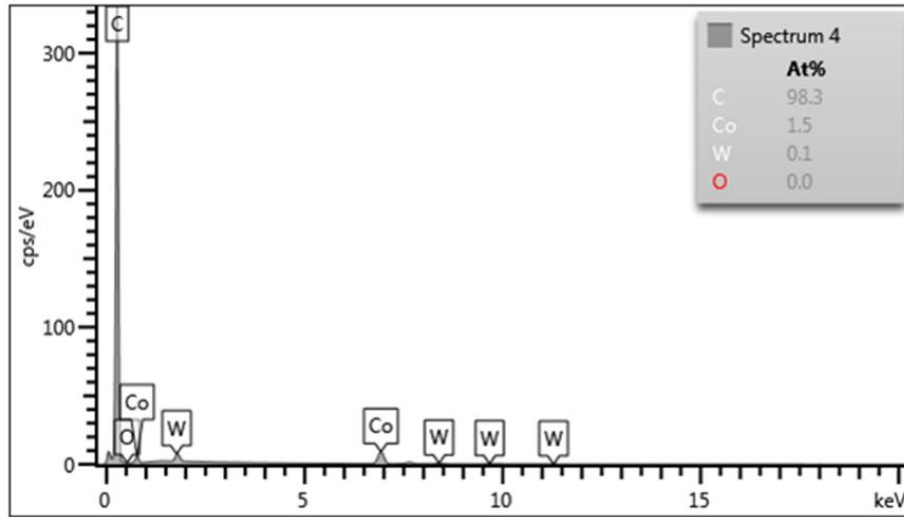
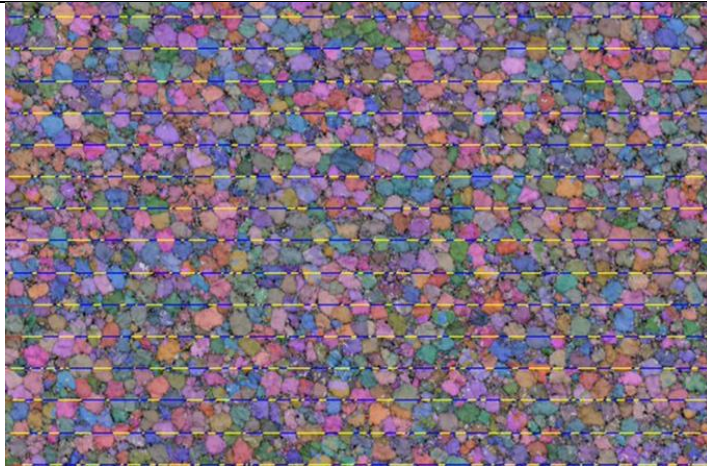
### Patent Infringement of the '565 Patent Under 35 U.S.C. § 271

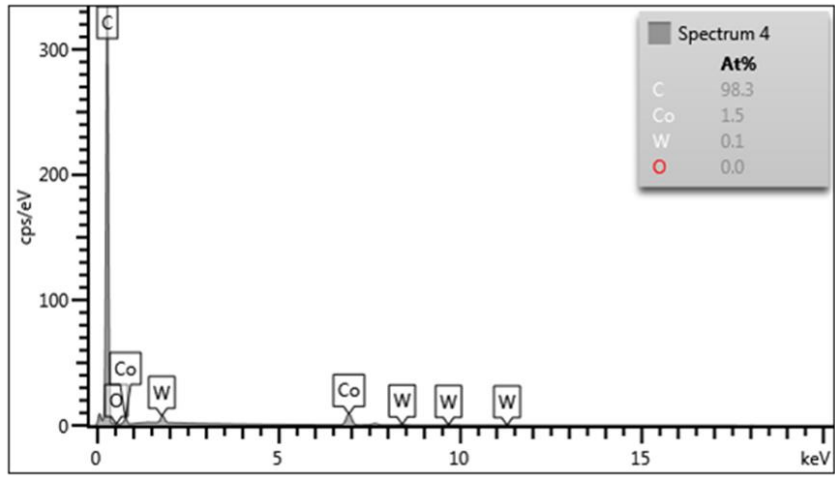
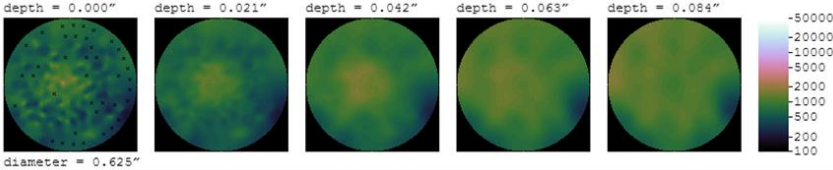
28. US Synthetic incorporates by reference every allegation set forth in the foregoing paragraphs of this Complaint as if fully set forth and restated herein.

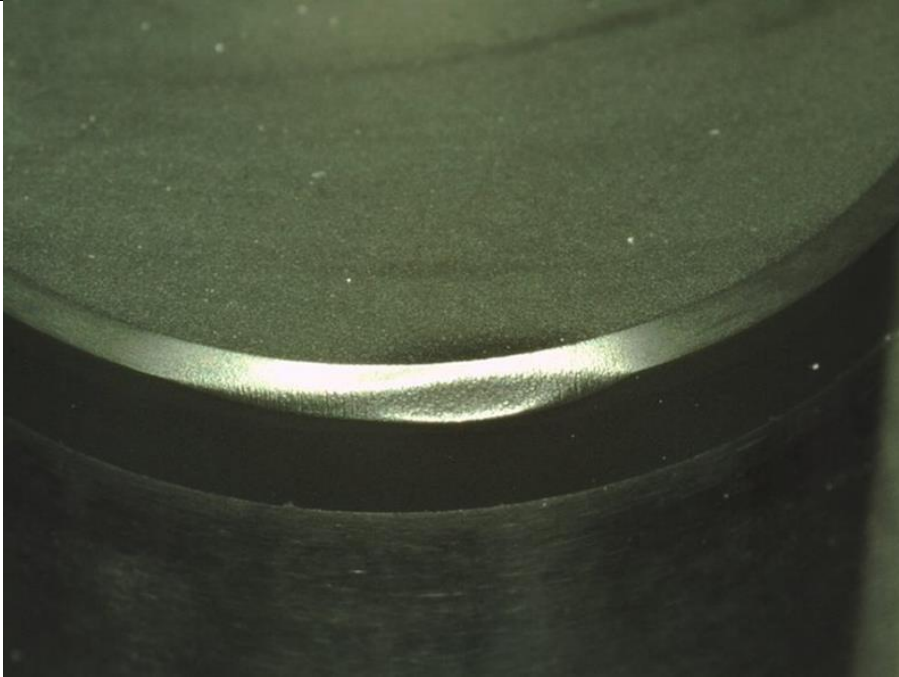
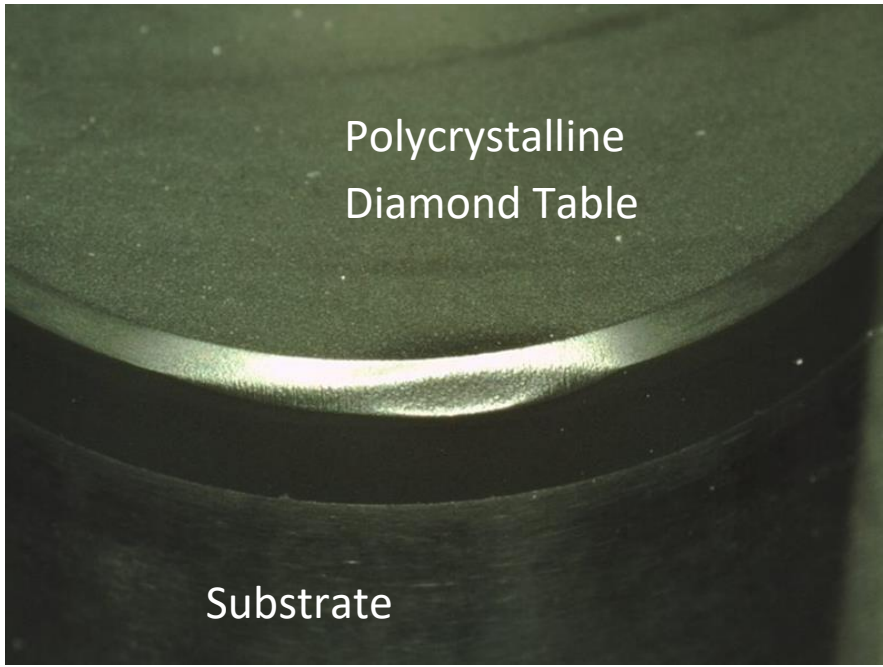
29. Haimingrun, without the authority or consent of US Synthetic, has been importing, offering to sell and selling, and continuing to offer and sell, in the United States Accused Haimingrun Products that infringe at least claims 1-4, 6, 8, 10, and 14 of the '565 patent.

30. The chart below sets forth exemplary infringement contentions for claim 1 of the '565 patent based at least in part upon testing performed by US Synthetic:

'565 Patent	
Claim 1	Accused Products
[1] A polycrystalline diamond compact, comprising:	 <p>Pictured above is an example of Haimingrun's 1613S18 product. The cutter is a polycrystalline diamond compact.</p>
[2] a polycrystalline diamond table, at least an unleached portion of the polycrystalline	An exemplary 1613S18 cutter includes a polycrystalline diamond table. The polycrystalline diamond table contains at least an unleached region as evidenced by the chart below:

'565 Patent	
Claim 1	Accused Products
diamond table including:	 <p>The image above shows the presence of at least one metal solvent catalyst, cobalt, in at least an unleached portion of the polycrystalline diamond table of an exemplary 1613S18 cutter.</p>
[3] a plurality of diamond grains directly bonded together via diamond-to-diamond bonding to define interstitial regions, the plurality of diamond grains exhibiting an average grain size of about 50 $\mu\text{m}$ or less;	 <p>The image above shows a plurality of diamond grains of an exemplary 1613S18 cutter. The EBSD average grain size of the imaged region is 4.79 <math>\mu\text{m}</math>.</p>

'565 Patent	
Claim 1	Accused Products
[4] a catalyst occupying at least a portion of the interstitial regions;	 <p>A catalyst occupies at least a portion of the interstitial regions of an exemplary 1613S18 cutter, as evidenced by the chart above.</p>
[5] wherein the unleached portion of the polycrystalline diamond table exhibits a coercivity of about 115 Oe or more;	The unleached portion of the polycrystalline diamond table of an exemplary 1613S18 cutter exhibits a coercivity of 157.7 Oe.
[6] wherein the unleached portion of the polycrystalline diamond table exhibits an average electrical conductivity of less than about 1200 S/m; and	<p>9 (number of data points = 1807 of 3440)  average conductivity = 784 S/m, surface conductivity = 565 S/m  min conductivity = 180 S/m, conductivity 98th percentile = 1441 S/m</p>  <p>The unleached portion of the polycrystalline diamond table of an exemplary 1613S18 cutter exhibits an average electrical conductivity of 784 S/m.</p>
[7] wherein the unleached portion of the polycrystalline diamond table	The unleached portion of the polycrystalline diamond table of an exemplary 1613S18 cutter exhibits a G-ratio of 5.17E7. The image below shows the cutter following the wet VTL test:

'565 Patent	
Claim 1	Accused Products
exhibits a $G_{ratio}$ of at least about $4.0 \times 10^6$ ; and	
[8] a substrate bonded to the polycrystalline diamond table.	 <p>The image above demonstrates a substrate bonded to the polycrystalline diamond table of an exemplary 1613S18 cutter.</p>

**Table 3. Exemplary Claim Infringement Chart for Claim 1 of the '565 Patent**

31. Defendant infringes the Asserted Claims of the '565 Patent directly and indirectly by causing direct infringement in the United States. Defendant will have had knowledge of the '565 Patent and the infringing nature of its Accused Products at least as of the date of service of this Complaint. Defendant infringes through contributory infringement by selling or offering for sale to third parties, such as its customers, products including at least the diamond compacts identified above, that are material parts of the inventions claimed in the '565 Patent, knowing that they were especially made or especially adapted to practice one or more of the claims of the '565 Patent, and that have no substantial noninfringing uses, and knowing they are in fact used to directly infringe one or more of those claims, at least through the allegations in this Complaint. Defendant also infringes at least one claim of the '565 Patent indirectly through inducement by, inter alia, importing, offering to sell and/or selling the Accused Products to third parties, including its customers, with the specific intent that those third parties directly infringe one or more claims of the '565 Patent. Defendant actively encourages or aids such infringement through various activities, including descriptions on its website and related materials, and knows—at least through the allegations in this Complaint—that the third parties' acts it has induced, and continues to induce, constitute infringement.

32. Haimingrun's infringement of the Asserted Claims of the '565 Patent has caused and continues to cause damages and irreparable harm to US Synthetic.

**THIRD CLAIM FOR RELIEF**


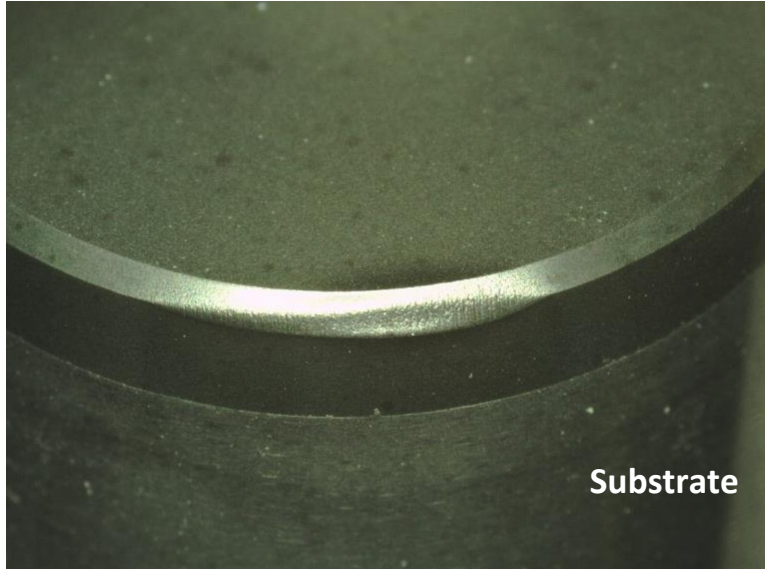
**Patent Infringement of the '306 Patent Under  
35 U.S.C. § 271**

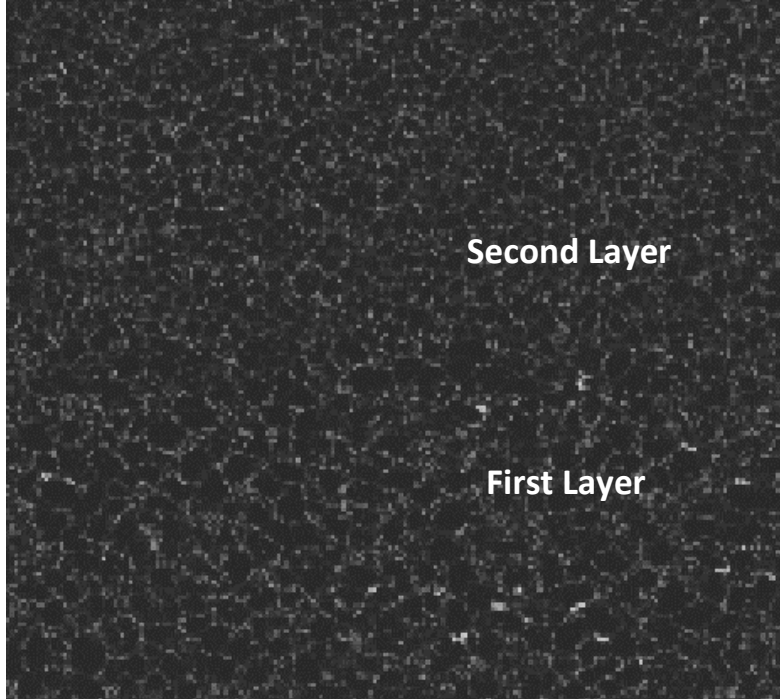
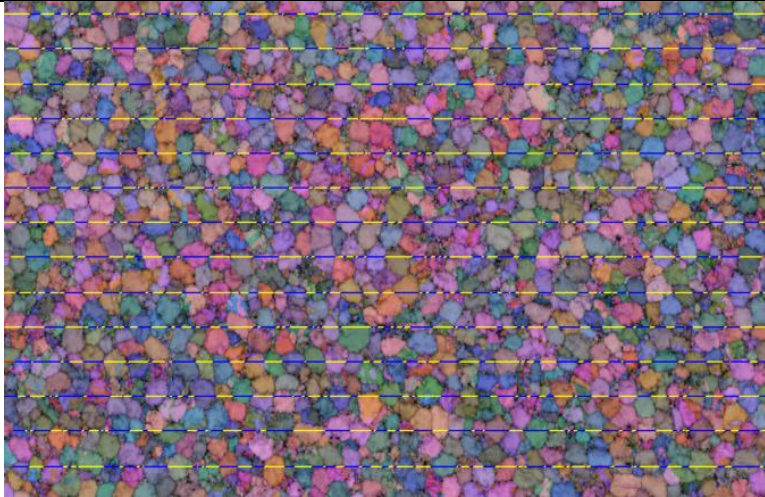
33. US Synthetic incorporates by reference every allegation set forth in the foregoing paragraphs of this Complaint as if fully set forth and restated herein.



34. Haimingrun, without the authority or consent of US Synthetic, has been importing, offering to sell and selling, and continuing to offer and sell in the United States Accused Haimingrun Products that infringe at least claims 15, 20, and 21 of the '306 Patent.

35. The chart below sets forth exemplary infringement contentions for claim 15 of the '306 Patent based at least in part upon testing performed by US Synthetic:

'306 Patent	
Claim 15	Accused Products
[1] A polycrystalline diamond compact, comprising:	 <p>Pictured above is an example of Haimingrun's 1613S18 product. The cutter is a polycrystalline diamond compact.</p>
[2] a substrate; and	<p>An exemplary cutter includes a substrate, as shown below:</p>  <p>Substrate</p>
[3] a polycrystalline diamond table including a first polycrystalline	<p>An exemplary cutter includes a polycrystalline diamond table including a first polycrystalline diamond layer bonded to the substrate and at least a second polycrystalline diamond layer exhibiting a second average diamond grain size that is less than a</p>

'306 Patent	
Claim 15	Accused Products
diamond layer bonded to the substrate and at least a second polycrystalline diamond layer exhibiting a second average diamond grain size that is less than a first average diamond grain size of the first polycrystalline diamond layer, at least an un-leached portion of the polycrystalline diamond table including:	<p>first average diamond grain size of the first polycrystalline diamond layer, as evidenced by a scanned image of the sectioned polycrystalline diamond table:</p> 
[4] a plurality of diamond grains defining a plurality of interstitial regions;	 <p>At least an unleached portion of the polycrystalline diamond table of an exemplary cutter includes a plurality of diamond grains defining a plurality of interstitial regions, as evidenced by the image above.</p>
[5] a metal-solvent catalyst occupying at least a portion of the	At least an unleached portion of the polycrystalline diamond table of an exemplary cutter includes a metal-solvent catalyst occupying



<b>'306 Patent</b>	
<b>Claim 15</b>	<b>Accused Products</b>
plurality of interstitial regions; and	at least a portion of the plurality of interstitial regions in the amount of 10.39% by weight.
[6] wherein the plurality of diamond grains and the metal-solvent catalyst collectively exhibit a coercivity of about 115 Oe or more and a specific magnetic saturation of about 15 G*cm <sup>3</sup> /g or less.	The plurality of diamond grains and the metal-solvent catalyst of an exemplary cutter collectively exhibit a coercivity of 161.6 Oe and a specific magnetic saturation of 14.31 G·cm <sup>3</sup> /g.

**Table 4.** Exemplary Claim Infringement Chart for Claim 15 of the '306 Patent

36. Defendant infringes the Asserted Claims of the '306 Patent directly and indirectly by causing direct infringement in the United States. Defendant will have had knowledge of the '306 Patent and the infringing nature of its Accused Products at least as of the date of service of this Complaint. Defendant infringes through contributory infringement by selling or offering for sale to third parties, such as its customers, products that are material parts of the inventions claimed in the '306 Patent, knowing that they were especially made or especially adapted to practice one or more of the claims of the '306 Patent, and that have no substantial noninfringing uses, and knowing they are in fact used to directly infringe one or more of those claims, at least through the allegations in this Complaint. Defendant also infringes the at least one claim of the '306 Patent indirectly through inducement by, inter alia, importing, offering to sell and/or selling the Accused Products to third parties, including its customers, with the specific intent that those third parties directly infringe one or more of the claims of the '306 Patent. Defendant actively encourages or aids such infringement through various activities, including descriptions on its

website and related materials, and knows—at least through the allegations in this Complaint—that the third parties’ acts it has induced, and continues to induce, constitute infringement.

37. Haimingrun’s infringement of the Asserted Claims of the ’306 Patent has caused and continues to cause damages and irreparable harm to US Synthetic.

### **DEMAND FOR JURY TRIAL**

Pursuant to Fed. R. Civ. P. 38, US Synthetic respectfully demands a trial by jury on all issues properly triable before a jury in this action.

### **PRAYER FOR RELIEF**

WHEREFORE, US Synthetic requests that this Court enter judgment in its favor on each and every claim for relief set forth above and award it relief including, but not limited to, the following:

A. The entry of judgement under 35 U.S.C. § 271(a), (b) and/or (c) that Defendant’s making, using, offering to sell, selling or importing of Defendant’s Accused Products prior to the expiration of the patents-in-suit will infringe, actively induce infringement, and/or contribute to the infringement of the patents-in-suit under 35 U.S.C. § 271(a), (b) and/or (c);

B. The entry of a preliminary and/or permanent injunction, enjoining Defendant and all persons acting in concert with Defendant from commercially manufacturing, using, offering for sale, or selling Defendant’s Accused Products within the United States, or importing Defendant’s Accused Products into the United States, until the expiration of the patents-in-suit, in accordance with 35 U.S.C. § 283;

C. The issuance of an order that Defendant deliver up for destruction all infringing products in its possession;

D. An award to US Synthetic of damages adequate to compensate for Defendant's infringement pursuant to 35 U.S.C. § 284, in an amount to be determined at trial, as a result of Defendant's infringement of the patents-in-suit;

E. An order determining that, with respect to Defendant, this case is exceptional and an award of attorney fees, costs and expenses incurred in bringing and prosecuting this case, pursuant to 35 U.S.C. § 285;

F. An award to U.S. Synthetic of its costs in this action; and

G. Any other relief as the Court may deem just and appropriate.

Dated: November 20, 2020

Respectfully submitted,

/s/ Miranda Jones

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